

HOW TO GUIDE: Using mojoRTK with a John Deere AutoTrac™ Universal

Description

This document describes how a mojoRTK system can be set up to be used with a John Deere AutoTrac™ Universal (ATU) steering kit. Its intended audience is a Leica approved Value Added Reseller.

Benefits

Using the mojoRTK system with an AutoTrac™ Universal allows auto-steer capabilities to be added to a wide range of vehicles that do not have factory installed steering kits. Additionally, the mojoRTK and AutoTrac™ Universal can be moved from one vehicle to another, allowing a single system to be used across a variety of machinery.

Limitations

While every effort has been made to ensure the mojoRTK is compatible with ATUs running any software version, testing has only been performed with the following versions:

- Original ATU: 1.02T, 1.05Z, 1.07N and 1.07R
- ATU 200: 2.05B

If you do not know what software version the ATU is running, please consult the ATU point of sale. They may be able to provide ATU software updates.

Required Items

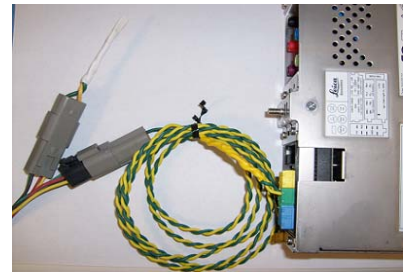
- **mojoRTK system kit** - For information regarding this system and the latest software versions, please visit www.mojoRTK.com
- **mojoRTK Interface Cable Kit for John Deere AutoTrac™ Universal** – The Leica Geosystems part number for this cable kit is 675792. It includes three items: a CAN interface cable, a power cable and a CAN terminator
- **John Deere AutoTrac™ Universal steering kit** - A list of vehicles suitable for use with the AutoTrac™ Universal steering kit is available from the John Deere website

Installation

Note: Please consult the mojoRTK User Manual for full installation instructions. This document is intended to provide steering kit specific information not included in the manual.

mojoRTK

You will need to connect the CAN interface cable's ISO C connector into the socket at the rear of the mojoRTK console. Route the cable such that the 4-pin connector can be connected to the AutoTrac™ Universal harness.



John Deere AutoTrac™ Universal

Consult the AutoTrac™ Universal Installation Instructions from John Deere for information on installing the steering kit in the vehicle.

Route the ATU Harness such that the 4-pin connector can be connected to the CAN interface cable and the 2-pin connector will be able to be connected to a power outlet via the power cable.

Cable Connections

1. Connect the 4-pin connector on the CAN interface cable to the opposite gender 4-pin connector on the ATU harness.
2. Connect the other 4-pin connector on the ATU harness to the CAN terminator.
3. Connect the power cable to a power socket in the tractor and connect the 2-pin connector to the opposite gender 2-pin connector on the AutoTrac™ Universal Harness.



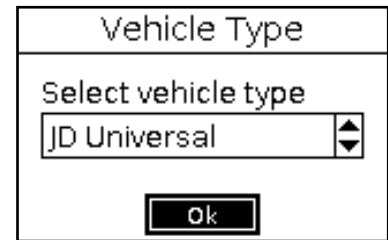
Note: If the power adaptor cable does not suit any power outlets in the tractor, it may be necessary to modify the power cable or make a customised one. If this is the case, use the tractor's switched (ignition) power to connect to the steering kit so that the battery is not discharged while the tractor is not in use.

Configuration

Note: Please consult the mojoRTK User Manual for general instructions on setting up the mojoRTK console. This document is intended to provide steering kit specific information not included in the manual.

Setting the steering kit

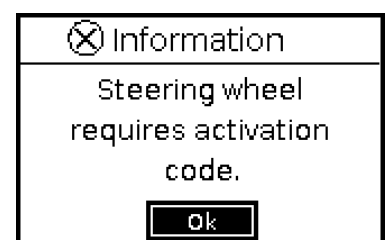
1. Follow through the stages of the mojoRTK Setup Wizard as described in the User Manual. At the 'Vehicle Type' screen use the main dial to select 'JD Universal' and press OK.
2. If the mojoRTK Setup Wizard has already been completed, you can access the 'Vehicle Type' screen by entering the main menu and selecting:
Settings- >Vehicle- >Vehicle Wizard
3. Proceed through the wizard until you reach the 'Vehicle Type' screen and use the main dial to select 'JD Universal' and press OK.
4. After a short time the screen will display a message similar to:
'CAN Bus Connected. Steering Kit Active'



Note: If the message indicates that the CAN bus is not connected or that communications with the steering kit failed, check the cable connections, as described in the 'Installation' section above. There must be a CAN bus connection from the console to the steering kit and the steering kit must be connected to power.

AutoTrac™ Universal activation code

When an AutoTrac™ Universal steering kit is used for the first time, an activation code must be entered on the mojoRTK console. This code can be obtained from the steering kit point of sale or from the John Deere website.





1. When the mojoRTK console detects that the steering kit requires an activation code, the following message will be displayed
2. Press OK to proceed to the code entry screen. Press Escape to enter the code later. To enter the code later, press OK from the Navigation screen to enter the main menu and select:
Settings- >Vehicle- >Steer Kit Wizard
3. This will take you to the code entry screen. To enter the code, use the main dial to select a digit and press OK to move to the next digit. Press Escape to return to the previous digit if you make a mistake.
4. Press OK when the last digit has been entered to confirm the code. The mojoRTK console will then send this code to the steering kit. This may take a few seconds.
5. A message will be displayed indicating whether the code is accepted or if it is incorrect. If the code is accepted, press OK to exit the code entry wizard and the AutoTrac™ Universal will be initialised. If the code is incorrect, press OK to return to the code entry screen to enter the code again. If you do not wish to try again at this time, press Escape from the code entry screen.

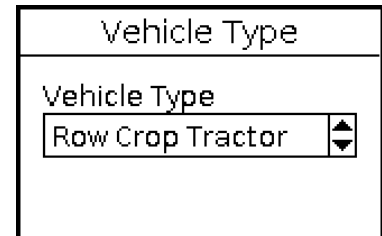
Setting up and tuning the AutoTrac™ Universal

- The AutoTrac™ Universal steering kit has a number of settings for optimising its performance. These settings vary depending on the software version of the steering kit.
 - For issues relating to the AutoTrac™ Universal firmware (including upgrades), see the point of sale for the steering kit.
 - A recommended set of parameters for each vehicle suitable for use with the AutoTrac™ Universal steering kit is available from the John Deere website. While these parameters will not suit all conditions, they are a good starting point for tuning the steering kit.
1. To access the AutoTrac™ Universal settings via the mojoRTK console, press OK from the Navigation screen to enter the main menu and select:
Settings- >Vehicle- >Steer Kit Wizard
 2. If the 'Steer Kit Wizard' option is not present, there is a communication problem between the mojoRTK and the AutoTrac™ Universal. Enter the 'Vehicle Wizard' and proceed until you reach the 'Vehicle Type' screen and ensure that 'JD Universal' is selected, as described in 'Setting the steering kit' above.

- If problems persist, check that the steering kit is powered and that the CAN bus cables are connected between the console and the steering kit.

Note: The 'Tuning Wizard' (as described in the mojoRTK User Manual) is absent for the AutoTrac™ Universal steering kit because tuning is handled by the settings in the 'Steer Kit Wizard'.

- The first setting for the AutoTrac™ Universal that needs to be set is the **Vehicle Type**. Use the main dial to select an option from the list and press OK to confirm the selection



Vehicle Type options vary depending on the ATU software version but may include: 'Articulated Tractor', 'Combine', 'Row Crop Tractor', 'Sprayer', 'Track Tractor' and 'Windrower'. The 'Vehicle Type' setting strongly influences the tuning of the steering kit and so it should be set before the other parameters are tuned.

Note: ATU software versions 1.07N and later (for the Original ATU) and 2.05B and later (for the ATU 200) include two of each vehicle type, numbered 1 and 2. In these versions of ATU software, the other settings are saved for each vehicle type. The benefit of this is that the ATU can be moved from one vehicle to another and the settings for each vehicle can be recalled by simply setting the vehicle type.

Changing the 'Vehicle Type' setting will sometimes cause the steering kit to "forget" its direction (See the Direction Detection section of this document). Therefore, it is recommended that if the vehicle type needs to be changed, that this is done first. If tuning of the other settings is then required, it is recommended that direction detection procedure (if required) be performed before tuning, as this will allow the tuning to be done while steering is engaged.

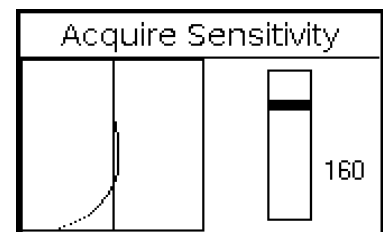
- Once you have set the vehicle type, it is recommended to set the **Operator Presence**. The options are 'Activity Monitor' and 'Seat Switch'. Use the main dial to select one or the other and press OK to confirm the selection. If your tractor has a seat switch that can be connected to the AutoTrac™ Universal Harness, this is the recommended option.

7. The remaining ATU settings may include 'Steer Wheel Speed', 'Acquire Sensitivity', 'Line Sensitivity – Tracking', 'Line Sensitivity – Heading', 'GPS Height', 'GPS Fore-Aft', 'Steer Asymmetry' and 'Steer Play'.

The John Deere AutoTrac™ Universal User Manual and Quick Reference Guide provide useful information on tuning these values.

8. When setting one of the numerical settings in the ATU Steer Kit Wizard, use the main dial to adjust the value. While steering is engaged, the cross track graph can assist with tuning by showing the effect of changing the setting value. Changes to the setting are applied live (i.e. before the setting value is saved), allowing the effect of the change to be seen immediately

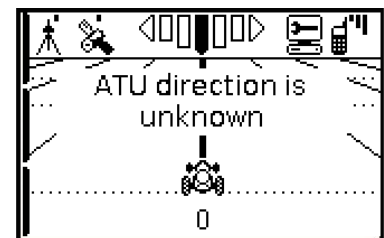
When you are satisfied with the setting value, press OK to save the value and continue to the next setting. Press Escape to undo any changes and return to the previous screen.



Direction Detection

- For the AutoTrac™ Universal to operate, it needs to determine the vehicle direction. Original ATU software versions earlier than 1.07N (released January 2008) require this to be done via a drive-and-turn manoeuvre. Original ATU software versions 1.07N and later and ATU 200 software versions 2.05B and later allow the direction to be set by the mojoRTK console.

- If the ATU has not yet determined direction by the time the operator turns off roading on the mojoRTK console, an 'ATU direction is unknown' message will appear.



- This message is to remind the user that the direction detection manoeuvre needs to be carried out. The direction detection process requires that a good quality GPS signal is available.
- To perform the direction detection manoeuvre drive in a straight line for 10 seconds, turn left at a 45 degree angle for 10 seconds and then turn right at a 45 degree angle for 10 seconds. The direction has been successfully detected once the message disappears.

- If the steering kit loses a good GPS signal at any time (e.g. the steering kit is turned off, the mojoRTK console is turned off, or the CAN connection is disrupted), the direction detection manoeuvre may need to be performed again. It may also need to be performed again if the ATU 'Vehicle Type' setting is changed.

Operation

Engaging steering with the AutoTrac™ Universal

To engage steering with the AutoTrac™ Universal steering kit, the following conditions must be met:

1. A good quality GPS position is required (red auto-steer not engaged/ready light will be lit) and terrain compensation tuning must have been performed successfully
2. The ATU must be connected to the mojoRTK console and powered on
3. The ATU must have determined its direction (See Direction Detection section of this document)
4. Waypoints (A/B points) must be set
5. Roothing (on the mojoRTK console) must be turned off
6. If the selected 'Operator Presence' method (in the 'Steer Kit Wizard') is 'Seat Switch', the seat switch must be connected and the operator must be seated
7. The center line on the Navigation Screen on the mojoRTK console must be bolded

When these conditions are met, steering is engaged by pressing the resume switch on the AutoTrac™ Universal steering kit.

Activity Monitor

For vehicles that are not equipped with a seat switch, the 'Operator Presence' detection method needs to be set to 'Activity Monitor'.

The 'Activity Monitor' is a 7 minute timeout which will cause steering to be disengaged if the operator does not respond. For 10 seconds before the timeout expires, the mojoRTK console will beep repeatedly and a message will be displayed on the screen.





It gives the operator the option to stay engaged ('Yes'), to disengage ('No') or to automatically stay engaged for future timeouts, until steering is disengaged by another means ('Always').

Steer Kit Information Menu

The steer kit information menu is available to Leica approved Value Added Resellers in the dealer menu. This menu provides a quick method of finding out steer kit settings such as software version, hardware version, serial number, direction and stop code.

Steer Kit Info	
Software Version:	1.05Z
Hardware Version:	1.0
Serial Number:	103969
Mode:	Disabled

Glossary

- ATU AutoTrac™ Universal steering kit from John Deere
- CAN Controller Area Network, the communication bus used between the mojoRTK console and the steering kit.
- Console The mobile receiver installed in the vehicle.